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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2872

DATE MAILED: 11/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

| | |
|--------------------------------------|----------------------------|
| Application No. 09/920,071 | Applicant(s) Aye |
| Examiner Leo Boutsikaris | Art Unit 2872 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on Aug 30, 2001

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) Claim(s) 6-25 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 6-25 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892)

4) Interview Summary (PTO-413) Paper No(s). _____

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s). 6

6) Other:

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DETAILED ACTION

Specification

1. A substitute specification excluding the claims is required pursuant to 37 CFR 1.125(a) because the nature of the existing amendments renders it difficult to arrange the papers for printing or copying.

A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

- (e) the invention was described in-(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published

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under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 6-12, 15, 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Orr.

Regarding claims 6, 15, Orr discloses a stereoscopic optical device (Fig. 4) comprising an interlaced waveguide hologram comprising a first holographic recording 3r and a second holographic recording 3l interlaced with the first holographic recording (lines 13-37, col. 7).

Regarding claims 7-8, 11, the first set of holographic cells 3r corresponds to a right visual field and the second set of holographic cells 3l corresponds to a left visual field (lines 21-46, col. 5). The combined effect is to present a three-dimensional scene to the viewer (lines 1-7, col. 3).

Regarding claims 9-10, the interlaced hologram 3 is used to produce two fields of view, one for the left eye and one of the right eye, the fields of view separated by a distance approximately equal to the distance between two eyes in a viewer e.g., approximately 2.5 inches . Masks 13l and 13r used for recording the corresponding holographic recordings correspond to the viewing apertures 5l and 5r. (see Fig. 2, 5, and lines 13-20, col. 5 and 58-60, col. 8).

Regarding claims 12, 24, the device of Orr further comprises a backlight 1, a first waveguide hologram and a liquid crystal display 9, wherein light from the light source is incident onto the first hologram, subsequently is incident onto the interlaced hologram 3 and then is

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diffracted to the LCD 9 before it is viewed by the left and right eye of the viewer (Figs. 2, 4 and lines 50-51, col. 4, 17-22, col. 8 and 13-22, col. 7).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orr in view of Gambogi.

Regarding claims 16-17, Orr discloses a method for fabricating the interlaced hologram 3, according to which a first mask 16 is positioned in a first position (corresponding to hologram recording 16l) over a substrate 10 coated with photosensitive emulsion; a second mask 13 is positioned in a first position (corresponding to position 13l), and the first holographic recording occurs; and the above process is repeated with the first mask 16 and the second mask 13 being positioned in a second position (i.e., shifted) for the recording of the second holographic recording (Figs. 5-7 and line 28, col. 8 to line 13, col. 9, also lines 3-8, col. 10).

However, Orr does not disclose that indexing fluid is used in conjunction with the photosensitive emulsion for the recording of the hologram. Gambogi discloses an LCD device comprising a holographic optical element, wherein index matching fluid such as Isopar is used in

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conjunction with the holographic emulsion (lines 46-61, col. 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use indexing matching fluid in conjunction with the photosensitive emulsion and the rest of the optical elements e.g. masks during the fabrication of the interlaced hologram for avoiding deleterious effects due to refraction at the various optical interfaces.

Regarding claims 18-19, the mask 16 comprises a series of equally spaced lines, some of which are opaque to mask holographic recording, and the width of which corresponds to the width of the cells 3r and 3l, i.e., it corresponds to the width of a LCD cell 9l or 9r (lines 53-54, col. 8). It is noted that claim 16 does not specify the nature of the photolithographic mask and the view region mask, hence each one of masks 16 and 13 may be characterized as a photolithographic or a view region mask.

Regarding claim 20, Orr does not specify the width of the LCD pixel. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the width in the claimed range, since it has been held that where the general conditions of a claim are disclosed in the prior art (i.e. the width corresponds to the width of a LCD pixel), discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 21, the mask 16 comprises a series of equally spaced lines i.e., blacked out regions. Again, as noted supra, claim 16, from which claim 21 depends, does not specify the nature of the photolithographic mask and the view region mask, hence each one of masks 16 and 13 may be characterized as a photolithographic or a view region mask.

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Regarding claim 22, Orr does not specify the pixel set which determines the distance between the blacked out regions. In other words, it may be a single pixel or a group of pixels. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the width in the claimed range, since it has been held that where the general conditions of a claim are disclosed in the prior art (i.e. the width corresponds to the width of a LCD pixel set), discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 23, the photosensitive emulsion may be silver halide (line 4, col. 10).

6. Claims 13-14 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orr in view of Eichenlaub.

Regarding claim 14, Orr discloses all the limitations of the above claim except for teaching that the backlight illuminating the first hologram (the one before the interlaced hologram 3) is collimated. Eichenlaub discloses an autostereoscopic display device wherein an LCD unit is backlit with collimated light emerging from Fresnel lens 102 (Fig. 4 and lines 52-67, col. 5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use collimated light for illuminating the series of holograms in Orr's device for exploiting the uniformity of the collimated light and thus achieving more efficient reproduction of the holograms recorded in the two HOEs.

Regarding claims 13 and 25, Eichenbaum does not specify that an array comprising micro-Fresnel lenses is used to collimate the back light. It would have been obvious to one of

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ordinary skill in the art at the time the invention was made to use an array of micro-Fresnel lenses as collimating means, since Official Notice is taken that arrays of micro-lenses are used in conjunction with display devices, for better coupling of the light to the arrayed holographic cells.

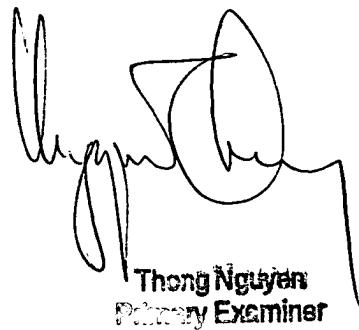
Conclusion

7. It is noted that a claimed interlaced hologram recording method using a combination of a photolithographic mask, and a view region mask, each mask comprising a series of openings with specified inter-distance would be allowable, since in Orr's method of making the interlaced hologram, the view region mask 13 comprises a single opening, through which light from the first hologram 12 is passed.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is (703) 306-5730.

Leo Boutsikaris, Ph.D.

November 14, 2002



Thong Nguyen
Primary Examiner